Aadya Arora

Final Year Undergraduate
Electrical Engineering
Minors in Artificial Intelligence
Indian Institute of Technology Gandhinagar

+91-9310499169
aadya.arora@iitgn.ac.in
Google Scholar
LinkedIn | Github | Website

Education

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech.	Indian Institute of Technology Gandhinagar	8.4	2022-Present
Senior Secondary	Delhi Public School R.K. Puram, New Delhi	94%	2022
Secondary	Holy Child School, New Delhi	97%	2020

Publications

- **Battery Chemistry Recommendation using Machine Learning** *GitHub*
  A. Arora, *S. Patil, P. Bhardwaj* *Communicated to IEEE IAS Journal*
- **MedFocusCLIP: Improving Few-Shot Classification in Medical Datasets using Pixel-Wise Attention** *ArXiv*
  A. Arora, *V. Namboodiri* *ICASSP*, 2025
- **WavShadow: Wavelet-Based Shadow Segmentation and Removal** *ArXiv*
  S. Jain,* ***A. Arora****, *V. Vekaria, K. Gandhi, S. Raman* *ICVGIP*, 2024

  *equal contribution

Work Experience

Microsoft — *May 2025 – Jul. 2025*
Data Scientist Intern Certificate

- Developed an AI-driven feature to automatically generate precise formatting commands for PowerPoint presentations based on natural language instructions.
- Built a streamlined pipeline for structured data preparation and creation of high-quality training examples.
- Implemented scalable query handling and evaluation processes to ensure robust and consistent model performance.
- Optimized model behaviour through iterative refinement, achieving higher accuracy and reduced errors on complex formatting tasks.

Internships

- **Layer-Wise Analysis for Image Editing with Diffusion Transformers** *Dec. 2024 – Apr. 2025*
  Advisor: Prof. R. Venkatesh Babu, Indian Institute of Science (IISc), Bangalore Demo
  - Conducted an in-depth layer-wise analysis of Diffusion Image Transformers (DITs) to investigate feature representations across different stages of the transformer architecture.
  - Explored novel methodologies for image editing tasks using DITs, focusing on enhancing fine-grained control and accuracy in generated edits.
  - Investigated unified attention masks that combine region-specific and global prompts, improving spatial fidelity and reducing prompt leakage in multi-region text-to-image synthesis.
  - Conducted fine-grained LoRA + DreamBooth experiments across selective DIT layer ranges (1–11, 12–34) to quantify how depth influences personalization quality, style retention, and overfitting behaviour.

- **Open-Vocabulary Few-Shot Referring Image Segmentation** *May 2024 – Jul. 2024*
  Advisor: Prof. Vinay Namboodiri, University of Bath, United Kingdom GitHub
  - Integrated adapter modules into the HIPIE (NeurIPS'23) framework to enable open-vocabulary, hierarchical segmentation guided by arbitrary referring expressions across diverse visual concepts.
  - Improved few-shot generalization by leveraging vision–language models (e.g., CLIP) to align textual queries with fine-grained semantic regions, enabling robust segmentation in complex real-world scenes.
  - Achieved a state-of-the-art mIoU of 85.15 (+2 over prior methods) on RefCOCO and RefCOCO+, demonstrating strong performance in both appearance-based and spatial referring expressions.
  - Conducted extensive analysis of hierarchical segmentation behavior (instance, part, and stuff-level) to understand failure modes and refine adapter-based feature modulation for improved region localization.

- **Advancing Autonomous Driving Systems for Indian Roads** *Dec. 2023 – Jan 2024*
  Advisors: Prof. CV Jawahar, IIIT Hyderabad and Prof. Vineeth N. Balusubramaniam, IIT Hyderabad Demo
  - Analyzed corner-case definitions and failure modes in autonomous driving by studying CODA and Indian Driving Dataset (IDD), focusing on rare, high-risk object scenarios in unstructured traffic.

– Evaluated closed-world, open-world, and class-agnostic Region Proposal Network (RPN) detectors, where the RPN proposes object regions without relying on predefined classes, enabling discovery of novel corner cases in IDD.
– Adapted a corner-case generation pipeline involving semantic segmentation, object detection, background removal, and common-class suppression to surface critical anomalies in IDD.
– Proposed extensions for India-specific challenges such as wrong-way driving and unusual traffic patterns, enabling more reliable detection under real-world conditions.

Selected Projects

- **Thermal-Vision Interpretability** *Aug. 2025 – Present*
  Advisor – Prof. Nipun Batra, IIT Gandhinagar Demo
  – Investigated why state-of-the-art Vision–Language Models (VLMs) fail on thermal imagery by analyzing attention heatmaps and patch-wise similarity patterns, which often overlook key objects such as people or animals.
  – Studied failures in CLIP's visual-text alignment on thermal images. Made a keen insight that similarity scores are concentrating on irrelevant background regions instead of semantically meaningful objects.
  – Implemented and evaluated Attention Prompting (API, ECCV'24) to guide VLMs toward object-relevant regions, improving reasoning accuracy and reducing hallucination on thermal scenes.
  – Exploring adapter-enhanced CLIP backbones and localization heads to produce sharper, more semantically aligned attention maps tailored for thermal imaging.

- **Next Character Predictor** *Mar. 2024 - Apr. 2024*
  Advisor - Prof. Nipun Batra, IIT Gandhinagar GitHub
  – Developed an MLP-based next character prediction model trained on several famous corpora.
  – Experimented with varying embedding dimensions and model architecture sizes to optimise prediction accuracy.

- **Human Activity Recognition (HAR)** *Jan. 2024 - Feb. 2024*
  Advisor - Prof. Nipun Batra, IIT Gandhinagar GitHub
  – Utilized the UCI-HAR dataset comprising time-series data capturing activities of thirty subjects.
  – Successfully classified six different activities, viz. walking, sitting, standing, running up, running straight, and running down.
  – Implemented advanced pre-processing and feature extraction techniques to improve classification accuracy.

Skills

- **Programming**: Python, C, C++.
- **Tools**: MATLAB, Autodesk Inventor, Jupyter Notebook, spyder, various python libraries like numpy, scipy, matplotlib, seaborn, pandas, PyTorch, Tensorflow, OpenCV.
- **Deep Learning Tools**: CNNs, RCNNs, ViT, mmDetection, mmSegmentation, SAM , SAM Adapter, Detectron, CLIP, DeepLabv3+, Diffusers, Azure OpenAI.

Relevant Courses

- **Completed Courses**: Machine Learning, Data Centric Computing, Probability, Statistics and Data Visualization, Linear Algebra and Single Variable Calculus, Data Structures and Algorithms, Machine Learning, Signal Systems and Random Processes, Control Systems, Differential Equations, Computer Vision, Digital Signal Processing, Deep Learning, Data Science, Artificial Intelligence.
- **Ongoing/Upcoming Courses**: Foundations Of AI, Matrix Methods for Signal Processing.

Positions of Responsibility

- **Reviewer**, IEEE Signal Processing Letters *Sep. 2025 – Ongoing*
  – Reviewed submissions in Image Processing and Computer Vision, providing detailed technical feedback to improve clarity, rigor, and reproducibility.

- **Management Coordinator**, Professional Development Council, IIT Gandhinagar *Aug. 2025 – Ongoing*
  – Led the planning and execution of institute-wide career development initiatives at IIT Gandhinagar, coordinating outreach, logistics, and student engagement across multiple cohorts as part of the Professional Development Council.

- **Teaching Assistant**, Probability, Statistics & Data Visualisation, IIT Gandhinagar *Jan. 2025 – Apr. 2025*
  – TA for a first-year course with 400+ students; developed instructional material and coding notebooks, graded assessments, and conducted tutorials, mock quizzes, and guest lectures to support large-scale course delivery.

- **Teaching Assistant**, Machine Learning, IIT Gandhinagar *Aug. 2024 – Nov. 2024*
  – Prepared teaching material, coding notebooks, and assignments; evaluated exams and quizzes; and led tutorials, mock quizzes, and guest lectures for a class of 250+ students.

- **Coordinator-Career Exposure and Guidance**, PDC, IIT Gandhinagar *Aug. 2024 – Apr. 2025*
  – Coordinated mentorship programs, internship preparation sessions, and career guidance initiatives for undergraduate students across disciplines through the Professional Development Council at IIT Gandhinagar.

- **Student Guide**, Student Support Services, IIT Gandhinagar *Aug. 2023 – Apr. 2024*
  – Mentored first-year students on academic, extracurricular, and personal matters as part of a faculty-supported guidance team.
- **General Member**, Professional Development Council (PDC), IIT Gandhinagar *Aug. 2023 – Apr. 2024*
  – Assisted in organizing professional development events and outreach activities aimed at enhancing student readiness for internships and higher studies.

Achievements

- **Inter-IIT Technical Meet 2025**, Achieved 2nd place out of 23 IITs in the ISRO Geospatial challenge.
- **Microsoft Pre-Placement Offer**, Received a pre-placement offer from Microsoft for a full-time Data Scientist role.
- **Microsoft Research India – Academic Summit 2025**, Selected to attend India's premier annual academic summits in AI.
- **Mathematics Excellence**, Earned **A-/A grades** across all core mathematics courses at IIT Gandhinagar.
- **KVPY (SX)**, Recognized in the **KVPY (SX) Extended List**.
- **State-Level Handball Athlete**, Represented Delhi in **state-level handball competitions**.
- **Class XII Academic Distinction**, Awarded the **Silver Medal** at Delhi Public School R.K. Puram for outstanding performance.
- **Class X School Topper**, Top-ranked student at **Holy Child School, Tagore Garden**.
- **Teaching Certification**, Completed the **Teaching Certification** program at IIT Gandhinagar.